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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/708,035

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Laertis Economikos

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SCHMEISER, OLSEN & WATTS

22 CENTURY HILL DRIVE

SUITE 302

LATHAM, NY 12110

EXAMINER

VU, DAVID

ART UNIT

PAPER NUMBER

2818

MAIL DATE

DELIVERY MODE

08/16/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/708,035

Applicant(s)

ECONOMIKOS ET AL.

Examiner

DAVID VU

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13-24 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11 and 13-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-11 and 13-24 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's arguments, see Brief of Appellant, filed on 06/01/07, with respect to the rejection of claims 11 and 13-20 have been fully considered and are persuasive. Therefore, the final rejection has been withdrawn. However, upon further consideration, a new ground of rejection is made in view of Jang et al. (US Pat. 6,869,858) and Kuehne et al. (US Pat. 6,372,605).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 11, 13, 14 and 17-24 are rejected under 35 U. S. C. 102(b) as being anticipated by Kuehne et al. (US Pat. 6,372,605, hereinafter Kuehne).

Kuehne in figs. 2A-2F disclose a method of fabricating a filled trench structure, comprising:

(a) forming a planarization stop layer 242 on a top surface of a substrate 240 (fig. 2A);

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(b) forming a first set of trenches (narrow trenches) in a first region and a second set of trenches (wide trenches) in a second region, trenches in first set of trenches having a higher aspect ratio than trenches in second region;

(c) depositing a fill material 248 in first and second set of trenches and on a top surface of planarization stop layer 248, fill material completely filling trenches (fig. 2B);

(d) forming a mask layer 250 on said fill material 248 (fig. 2C)

(e) removing an upper portion of fill material 248 by an etched back process (fig. 2D and col. 4, line 66 through col. 5, line 2);

(f) removing masking layer 250 (col. 5, line 3); and

(g) removing, using a planarization process, all fill material from top surface of planarization stop layer, a top surface of fill material in first and second sets of trenches coplanar with top surface of planarization stop layer (fig. 2E and col. 5, lines 12-17).

3. Claims 11, 13, 14 and 17-24 are rejected under 35 U. S. C. 102(e) as being anticipated by Jang et al. (US Pat. 6,869,858, hereinafter Jang).

Jang in figs. 6, 8 and 10 disclose a method of fabricating a filled trench structure, comprising:

(a) forming a planarization stop layer 28 on a top surface of a substrate 10;

(b) forming a first set of trenches in a first region W2 of planarization stop layer and substrate and forming a second set of trenches in a second region W3 of planarization stop layer and substrate, trenches in first set of trenches having a higher aspect ratio than trenches in second region (fig. 6 and col. 10, line 62 through col. 11, line 7);

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(c) depositing a fill material 22 in first and second set of trenches and on a top surface of planarization stop layer 28, fill material completely filling trenches (col. 11, lines 8-28);

(d) removing an upper portion of fill material 22 by an etched back process (dry/wet etching) (fig. 8 and col. 12, lines 4-17); and (e) removing, using a planarization process, all fill material from top surface of planarization stop layer, a top surface of fill material in first and second sets of trenches co-planer with top surface of planarization stop layer (fig. 10 and col. 12, lines 48-56).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 15, 16 and 20 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Jang (US Pat. 6,869,858).

Jang fails to disclose the fill material is removed about 5 to 20% of the as deposited thickness (claims 15&20); and the aspect ratio of the first/second trenches (claim 16). It would have been obvious to one with ordinary skill in the art at the time of the invention to perform an etched back process step as taught by Jang. The amount of the fill material being etched and the aspect ratio of the first/second trenches does not define patentable over Jang since it is well known processing variable and the discovery of the optimum or workable range involves only routine skill in the art. The specific amount of the semiconductor being etched does not provide any critical or unexpected results to the method of manufacturing a semiconductor device. Rather, it is merely an obvious selection of the etching amount based on desired functional characteristics determinable by routine experimentation. In *Aller*, the court stated, "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456 105 USPQ 233,235 (CCPA 1995).

Response to Arguments

5. Applicant's arguments with respect to claims 11 and 13-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The art cited on the *Notice of References* is included as teaching the general state of the art relating to the instant invention.

US Pat. 7,078,314 (Kim et al.) is cited as teaching a memory device having a periphery isolation region and core isolation region. A core trench having an aspect ratio of approximately 7.0-8.0 or more and a periphery isolation trench having an aspect ratio of approximately 7.0-8.0 or less (col. 13, lines 12-13 and lines 56-57).

US Pat. 6,124,183 (Karlsson et al.) is cited as teaching a method of fabricating a filled trench structure by : forming a photoresist planarization mask is thereafter on the insulating material above the large trenches, followed by an isotropic etch to remove more of the insulating material. Planarization is completed by removing the planarization mask and performing a second polish down to the polish stop, as by CMP (figs. 2A-2J).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Vu whose telephone number is (571) 272-1798. The examiner can normally be reached on Monday-Friday from 8:00am to 5:00pm. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke H can be reached on (571) 272-1657. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR, Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



DAVID VU
PRIMARY EXAMINER